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ABSTRACT

The Black Country is a region comprised of four local educational agencies (LEAs) in the West Midlands, England. School-league table data for the period 1992-94 were collated to form a data matrix. Using cluster analysis, 11 types of schools were identified. An analysis of electoral ward census data yielded six types of localities. Both typologies were combined to form the data matrix in order to determine the relationship between location and school characteristics. The matrix is a potential method for defining the effectiveness of school-improvement initiatives against their baseline data. The paper also discusses the potential implications for identifying process variables and appropriate school-performance indicators, as well as how to accomplish this by comparing within-cell and across-cell variations. The method may make possibile regional studies within and between European Union member states. Six figures and five tables are included. (LMI)

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Locality Types and School Types: Towards Baselines for Improvement and Effectiveness in Secondary Schools

Presented at the First European Conference on Educational Research, Bath, 14-18th September 1995

Abstract

The Black Country is a region comprising four LEAs situated in the West Midlands, England. School league table data for the period 1992-1994 was collated to form a data matrix. Using cluster analysis, eleven distinct types of schools could be identified. This was paralleled by an analysis of electoral ward census data that yielded six types of locality. The characteristics of the school and location typologies are discussed. It is acknowledged that league table data does not capture the mechanics, dynamics, and spirit of each school. However, it was considered appropriate to juxtapose both typologies to produce a matrix to determine the relationship between location and school characteristics. The matrix provides a potential methodology for defining the effectiveness of school improvement initiatives, as each school's original co-ordinates in the matrix effectively act as a baseline data points. Changes in a school's co-ordinates might then be construed as an outcome of school improvement initiatives. The potential implications for identifying process variables and appropriate school performance indicators and how this might be achieved by comparing within cell and across cell variations are discussed. This exploratory analysis raise the question of regional studies within and between European Union member states.

Key Words: England; Secondary Schools; Urban Localities; Academic Effectiveness

Introduction

Rutter, Maughan, Mortimore and Ouston (1979) clearly demonstrated that schools do influence academic outcomes. Research into school effects and value added is ongoing and is becoming increasingly sophisticated in its use of statistical techniques. There has been a move away from the analysis of school outcomes by neighbourhood features to increasingly more student centred measures of prior ability, background and attainment on exit. The emphasise is on choosing best predictors of exam outcome from which can it be determine whether a school does better (adds values) than predicted or worse (subtracts value). This work is one valuable strand in evaluating school outcomes. Our work, whilst taking note of the importance of deriving reliable and readily meaningful indices of value added, is currently more concerned with:

- How do schools vary in performance in a tightly defined regional context? Performance can initially be defined in terms of academic outcomes, but must also be defined in terms of developing skills and dispositions for active citizenship.
- How meaningfully can neighbourhoods be grouped in terms of similarity?
- To what extent does the type of neighbourhood systematically determine the parameters of school outcomes? (Conduit, Brooks, Bramley and Fletcher, 1995)
- The extent to which policy options for education are debated at local level and are informed by the available data. This includes issues relating resource usage and the effectiveness of targeting.
- How far can evaluation be concerned with the intrinsic worth of education? Can this be tailored to local and regional requirements? Issue of accountability.

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- The production of a more refined methodology, which is concerned with the significance of process and context and that cuts across discipline boundaries (Scheerens, 1990; Climaco, 1992).

- The management of data at a regional level and participation in its interpretation by stakeholders in education.

Methodology: understanding school performance at a regional level.

Our methodology treated data relating to neighbourhoods (census data) and schools (league table data) as separate entities. No attempt to link census data directly to published school outcome data was made, for example.

Classification of Neighbourhoods

The following data was collated on the 89 electoral wards[1] in the Black Country and was subjected to cluster analysis.

% Households with no car
% Households with 2+ Cars
% Households that own their home / mortgaged
% Households that privately rent
% Households that live in local authority housing
% Households that live in Housing Association property
% Households that are overcrowded
% European origin
% Black
% Indian / Pakistani
% Other Asian
% Full-time Male Employment
% Full-time Female Employment
% Part-time Male Employment
% Part-time Female Employment
% Self-employed Males
% Self-employed Females
% Males on Govt. Scheme
% Females on Govt. Scheme
% Unemployed Males
% Unemployed Females
% Economically Active Males
% Economically Active Females

This analysis was undertaken using the UPGMA method and yielded six clusters. These six clusters were collectively named '*genius loci*' as they pertain to the special (common or similar) spirits[2] of the localities that they represent. They are relatively stable subject to the addition of new census data. The features of six genius loci are summarised in table one. The validity of the clusters was established by:

i) Inspecting star charts of electoral ward for deviation from common patterns. (Figures one to six are star charts of the mean statistics of the six genius loci. They are interpreted by examining each co-ordinate in relation to the central ring which represents the Black Country averages. Co-ordinates within the ring represents levels below the regional average and the nearer centre they are the more significant they can be said to be defining features of the genius locus. Likewise, co-ordinates which are furthest from the centre are defining features.)

ii) Discriminate function analysis: it was predicted that a good cluster solution when subjected to discriminate function analysis would yield a high reclassification rate. The percentage correctly reclassified was 90.70%. In conjunction with visual inspection of the star charts, some electoral wards were reclassified.

[1] An electoral ward is the smallest area of electoral representation in the United Kingdom.
[2] By *spirit* it is implied that a neighbourhood is more than economics, racial composition and buildings. Community spirit is difficult to quantify but has potentially significant effects on school outcomes.

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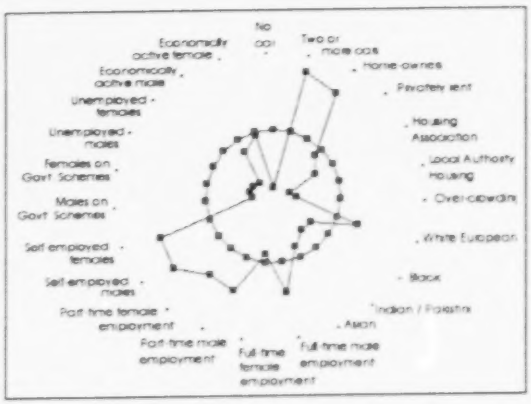
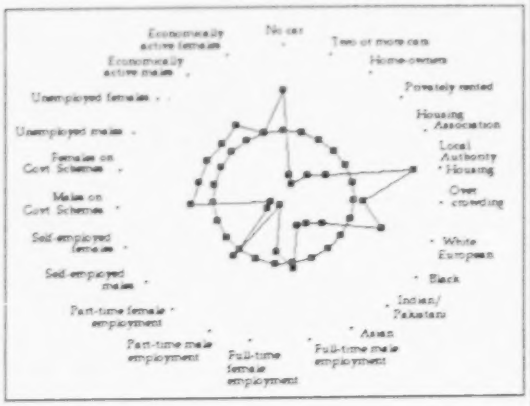
FIGURES 1 TO 6: STAR CHARTS REPRESENTING DEFINING FEATURES OF THE SIX GENIUS LOCI

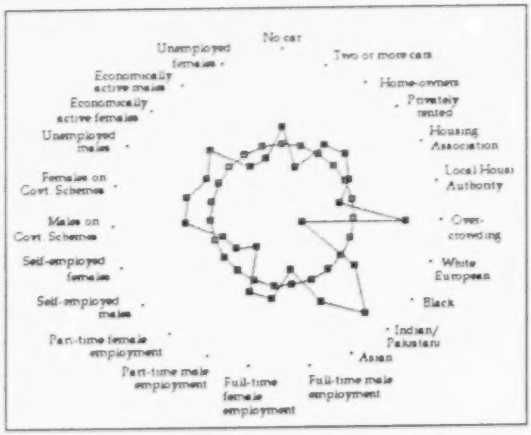
Genius Locus One



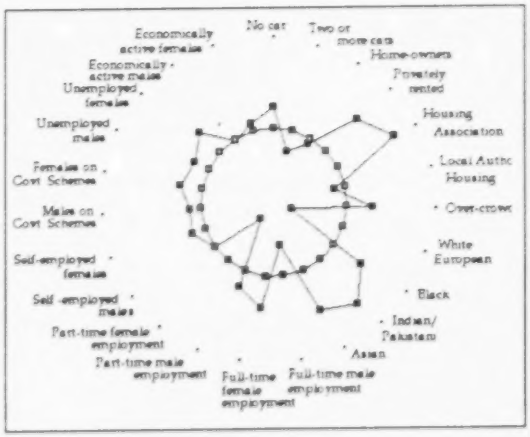
Genius Locus Two



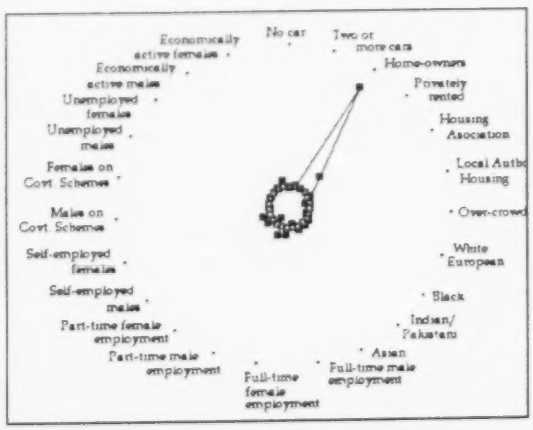
Genius Locus Three



Genius Locus Four



Genius Locus Five



Genius Locus Six

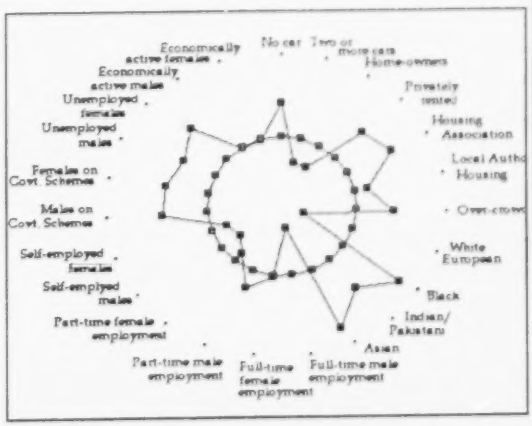


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Table 1: Defining Features of Six Genius Loci

Genius Locus One

- Above average car ownership - households with 2+ cars 40% higher than nationally.
- Home ownership a fifth higher than nationally
- Unemployment a third lower than nationally
- Self-employment matches the national average
- Predominately white

→ *Two Incomes White Localities*

Genius Locus Two

- Below average car ownership - a quarter more households than the national average do not have a car.
- Home ownership a fifth lower than nationally
- Double the national level of Local Authority housing
- Unemployment two-fifths higher than nationally.
- Maps onto regional average for full-time male employment
- Predominately white, with Asian populations below the regional average.
- Self-employment two fifths lower than nationally
- Overcrowding higher than nationally

→ *White (Insecure) Working Males*

Genius Locus Three

- Home ownership maps onto the national average
- Large Asian community (Indian / Pakistani) differentiates this cluster from clusters one and two
- High level of overcrowding
- Below regional average for Local Authority housing
- Full-time male employment below regional average
- Full-time female employment above regional average

→ *Asian Home Owners*

Genius Locus Four

- Households without a car is 1.5 times the national average
- Home ownership averaged 85% the national norm
- Private rented sector is a fifth higher
- Housing association sector three times the national average
- Local Authority housing a fifth higher than nationally, but below regional norm
- Full-time female employment higher than regional average
- Full-time male employment lower than regional average.
- Male unemployment 19.7%

→ *Ethnically Mixed, Working Female Localities*

Genius Locus Five

- A single electoral ward
- (Graph distorted)
- Maps on most regional averages for census statistics, but approximates national home ownership levels
- Private rented sector two and half times national average
- Can be said to situated between clusters one and two and clusters three, four and six in terms of sizes of ethnic populations
- Can be said to be situated between cluster one and other clusters in terms of indices of employment and affluence.
- High levels of individuals aged 24-44 and 65 plus.
- High concentration of professional households
- Population of under 16 a fifth lower than the regional average

→ *Transitional*

Genius Locus Six

- Three fifths of households do not a car
- Home ownership is half the national average
- Private rented sector is a third larger than nationally
- Double the national level for Local authority housing
- Two and half times the level of overcrowding - highest levels in the region
- Half the population is white. A third of Indian / Pakistani origin and the remaining being Black.
- Economic activity broadly in line with other clusters

→ *Highly Deprived, Multiethnic Localities*

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iii) If the genius loci are distinct, then statistical analysis should yield significant differences amongst clusters in terms of the attributes used in their definition. This analysis is reported in detail by Bramley and Fletcher (*mimeo*).

iv) It was expected that school outcomes should fall within certain parameters according to the genius locus in which they are located or from which they predominately recruit students. Schools were assigned to genius loci one to four (no school was placed in either genius loci five and six). Schools were then categorise according to which quartile their results fell into in 1994. A total of 74 schools were cross-tabulated (table two)[3]. A Pearson chi square value of 25.06 ($v=9$, $p<.01$) was obtained. A one-way ANOVA was also performed on the raw data ($F=8.92$, $p<.001$) and Tukey LSD post hoc tests indicated significant differences in performance between genius locus one and genius loci two and three at $p<.05$ level.

TABLE TWO: DISTRIBUTION OF EXAMINATION RESULTS BY QUARTILE AND CLUSTER.

	Genius Locus 1	Genius Locus 2	Genius Locus 3	Genius Locus 4	Row Total
Less than 17%	2	16	4	0	22 (29.7%)
17% to 28%	3	16	2	1	22 (29.7%)
28% to 44.5%	10	6	2	0	18 (24.3%)
44.5% plus	8	2	1	1	12 (16.2%)
Column Total	23 (31.1%)	40 (54.1%)	9 (12.2%)	2 (2.7%)	74 (100%)

A Pearson chi-square value of 25.06 (DF, 9) was obtained which was significant at the $p<.01$ level[4]

The validation strategies cautiously support the existence of genius loci. The use of a single year's examination data to validate their effect on school outcomes is *not* sufficient for establishing possible parameters of performance based on catchment area. The next stage of the study was the identification of schools with similar patterns of performance and organisation.

[3] Independent schools and those with no easily defined catchment area were excluded.

[4] For statistical reasons it may have been appropriate to have collapsed clusters three and four, due to an expected frequency of less than in five in some of the cells.

Definition of School Types

Cluster analysis was performed on the 1992 to 1994 league table data. It was felt that three years data were realistically the minimum for analysis purposes. This data includes both examination outcomes and organisational data. Some variables were transformed for analysis purposes, for example, absences was converted into time in class.

The following dichotomous variables:

- Grant Maintained
- Voluntary
- Selective
- Coeducational
- Sixth form
- Operates special classes for pupils with educational needs

The following variables were standardised across the Black Country school data set.

- Percentage of pupils receiving A to C passes in the years 1992, 1993, and 1994
- *Time-in-class* - calculated by

  (100- (% authorised + % unauthorised absence)) x timetabled hours (1994 data)

- Size of year eleven in years 1992 to 1994
- Percentage of pupils with one or more A to C passes in 1992
- Percentage of pupils with five or more A to G passes
- Percentage of pupils statemented in each school in 1993 and 1994
- Percentage of pupils gaining vocational qualifications in 1993 and 1994

Eleven clusters of schools were defined. The eleventh cluster will not be used for analysis purposes as it comprises of a single unique case (a Steiner School) and is therefore easily identified. The features are summarised here, but are to be reported elsewhere in greater detail (Bramley, 1995, *mimeo*).

The 1995 data is to be used to check the robustness of the classification. In subsequent years that schools may demonstrate increasing effectiveness by being reclassified. The parameters of the classifications are to be held constant for a five year period.

TABLE THREE: DEFINING FEATURES OF TEN SCHOOL TYPES

Independents Schools	*Maximal Performers*
• Mainly characterised by the fact they are independent. Tendency to exhibit good examination results, but not necessarily so.	• Almost consistently 100% 5+ A to C passes. • Sizeable Sixth Forms • Statementing below regional average • High time-in-class
Near-Maximal Performers	*Good Performers*
• Low to mid nineties in terms of 5+ A to C passes over the period 1992 to 1994 • Large Sixth Forms • Decline in Statementing • High time-in-class	• Results above national and Black Country average. • Typically no sixth form • Statementing typically below regional norms • Time-in-class well above regional norms
Middle Performers	*Lower-middle attainers with high time-in-class*
• Below regional average in terms of five or more A to C passes, but distribution cuts across this average, performance typically in high twenties. • Statementing below regional norms, • Time-in-class is above regional norms	• In 1992 there was wide dispersion in terms of percentage of pupils with 5+ A to C passes below the Black Country average. In terms of 1+ A to C these schools were located between the Black Country and national average. • In 1993 examination performance was moving towards Black Country average, but there was no improvement in comparative position in 1994. • Above average statementing. • Above average time-in-class • Sizeable Sixth Forms
Lower-middle attainers	*Large Schools with successful vocational provision*
• The percentage of pupils obtaining 5+ A to C passes being in the low to mid teens. • Average performance in terms of 1+ A to G passes, and below the Black Country average in terms of 5+ A to G passes. Dispersion on these indices has increased since 1992. • Schools within this cluster typically do not have a sixth form. • Statementing has increased from just below to above average for the region. • Below the regional norm for the time-in class index	• Performance during the period 1992-94 has tended to be in the high teens to low twenties in terms of five or more A to C passes • Sixth forms • High levels of statementing • Below regional norms in terms of time-in-class.
Low attainers	*Steady Decliners*
• These schools exhibited in 1992 the lowest percentage of pupils with 5+ A to C passes. This cluster still ranked within the bottom three in 1993; however, in 1994 did better than cluster named steady decliners. • having a small sixth form, • above average number of pupils of statementing for the Black Country, which is increasing, • below the regional average time-in-class.	• Gradual decline in examination performance recorded in 1992 that was in the mid-teens in terms of percentage of pupils with five or more A to C passes. • having sixth forms. • Statementing has increased in these schools from being average for the region. • Time-in-class is very low compared with other schools in the region.

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Development of School Effectiveness Matrix

Secondary schools are assigned respectively to the most appropriate genius loci (locality type) and school types. Schools with obviously wide catchment areas, or which extensively recruit outside the region were not assigned to a genius locus, whilst other schools are provisionally assigned to a genus locus. The additional sources of data (Ofsted Reports, case studies, for example) and direct contact with schools are used to refine classification. This classification procedure is essentially iterative in nature. School types are defined from their original cluster membership, but in subsequent years schools that demonstrate outcomes which are different to their current classification will be reassigned. Reassignment is one indication of changes in school effectiveness.

The two typologies described are cross-tabulated to produce subtypes. This cross-tabulation produces the school effectiveness matrix. If school types are ranked in terms of perceived performance and genius loci in terms of relatively contextual advantage[5] then school effectiveness matrix similar to below is produced.

TABLE FOUR: A POSSIBLE DEFINITION OF SCHOOL EFFECTIVENESS

High Performance	HE	HE	E	E	D
⇑	HE	E	E	D	N
Medium Performance	E	E	D	N	N
⇓	E	D	N	N	IE
Low Performance	D	N	N	IE	IE
	Low contextual advantage		Middle contextual advantage		High contextual advantage

KEY

HE	Highly effective schools
E	Effective schools
D	Schools that demonstrate that socio-economic situation affects performance
N	Schools that are *not* effective.
I E	Ineffective schools

More specifically to the region's data set, the following matrix ix produced.

[5] 'Contextual advantage' could be more appropriate concept than 'contextual disadvantage' for comparing schools' contexts. Relative advantage goes from least to most whereas relative disadvantage goes from the greatest to an absence of disadvantages. All contexts it could be argued have some advantage whilst some contexts have many advantages.

TABLE FIVE: A REGIONAL SCHOOL EFFECTIVENESS MATRIX

	Two-incomes white localities (A)	White insecure working male (B)	Asian Home owners (C)	Ethnically mixed working female localities (D)
Good Performers	12⇔ a4	*2⇧⇧ b4*	*1⇧⇧ c4*	*1⇧⇧ d4*
Middle Performers	4 a5	10⇔ b5	*3⇧⇧ c5*	0 d5
Lower-middle attainers with high time in class	2 a6	4⇔ b6	*1⇧⇧ c6*	0 d6
Lower-middle attainers	5⇩ a7	18 b7	4⇔ c7	0⇔ d7
Large schools with successful vocational education	0 a8	2 b8	0⇔ c8	1⇔ d8
Low attainers	0 a9	2⇩ b9	0 c11	0 d9
Steady Decliners	1⇩⇩ a10	1⇩⇩ b10	0 c10	0 d10

Key

⇧⇧ Highly effective schools
⇔ Those schools where it might be interpreted that "contextual advantage" influences outcomes and might be said to be effective given their context.
⇩ Schools that are ineffective
⇩⇩ Increasingly ineffective schools

There were potentially 66 subtypes[5] of secondary schools, but only 23 were exhibited.

Reservations & Future Directions

- The validity of defining school effectiveness as being contingent on "contextual advantage". Contextual advantage is defined as home, community and economic factors. Each child's education is an unique set of interactions amongst child's abilities, self-expectations, aspirations, motivation and home factors, community factors, economic factors, teacher's expectations, opportunities, school organisation and so fourth. The secondary school child has limited control over many of these factors and only becomes autonomous in his or her late teens. These constraints will influence a child's examination outcomes.

- The extent to which a community's spirit - genius locus - can be approximated by census data? Additional data may be added as it becomes more widely disseminated. Such data might result in some localities being differently clustered and / or the emergence of additional clusters. There are also the problems of the data becoming increasingly out of date and that data relating to the 10% sample (for example, occupational class of head of household) takes longer to become available and do so in more piece-meal fashion.

- The appropriateness of the electoral ward as the unit of analysis. Small area statistics are becoming more readily available and this makes more micro-level analysis possible.

[5] Where full typologies are used

- To what extent can clusters of localities be ranked in terms of contextual advantage? This process is in many respects dependent of value judgements, but could be anchored to purely economic indicators. However, economic indicators do not capture the substance of a neighbourhood entirely.

- The validity of comparing within region school outcomes and converting them into normative indexes for the region? The school typology is based on normalised scores for the region and may not be transferable to other regions.

- The need to define an index of how well each child is prepared for active citizenship. Schools do have the responsibility of equipping their students for adult life! This is likely to take the form of a composite index and its development requires a greater understanding of how students manage the changes from secondary education onwards.

- The extent to which the school effectiveness matrix can be used to pull non-league table data together on the 89 schools in the Black Country for systematic analysis. These data include press reports, Ofsted reports, prospectuses, annual reports, case studies and various other data which is not actively organised, for example, undergraduate and masters projects that are school based, LEA sponsored school improvement projects and community based projects.

- The relevance of the data base under construction to practitioners, policy makers and others with a stake in the region's education. The development of constructive dialogue in its interpretation is ongoing.

- Implications with regard to targeting resources / interventions. These interventions can be broader than just intervening in the school and include community action and self help. It is hoped that the matrix described here will facilitate the organisation of detailed and often diffuse information in such a way that it becomes *more* manageable for developing educational policies that are responsive to localised needs.

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